



CICEP

INNOVATION AND ECONOMIC PROSPERITY UNIVERSITIES
AWARDS PROGRAM

CASE
STUDY
2015

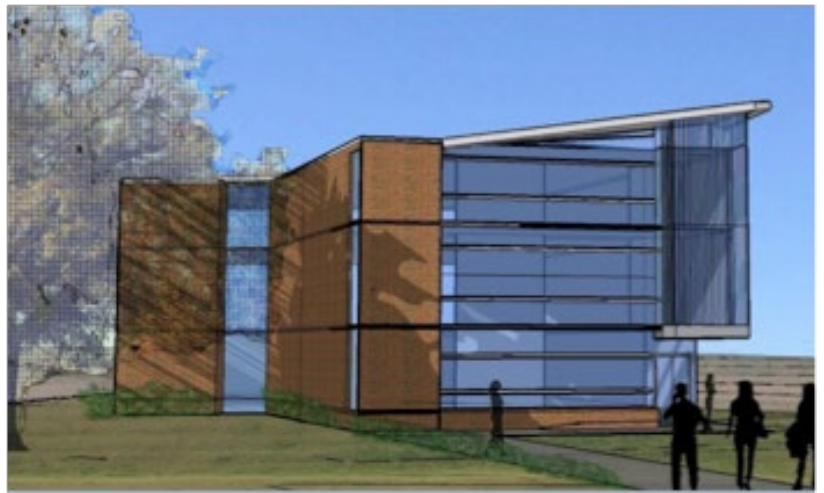
IEP CATEGORY • TALENT

Models for Statewide P–20 Workforce and Youth Development

The Clemson University Center for Workforce Development (CUCWD) and the Youth Learning Institute (YLI)

Clemson works closely with industry clusters in SC and responds to talent development needs to provide expertise in the areas of workforce and youth development in order to grow the state economy.

WORKFORCE DEVELOPMENT. Advanced manufacturing represents one of the highest paying, fastest growing employment sectors in SC, but more than 40% of jobs in manufacturing will require postsecondary education by 2018.¹ Currently, SC is not producing enough graduates to fill these jobs.² The Clemson University Center for Workforce Development (CUCWD) was created to address this gap between available jobs in manufacturing and access to relevant education for those jobs. Home to the only National Science Foundation (NSF) funded Advanced Technician Education (ATE) Center at a four-year university in the United States, CUCWD is a research and educational resource that serves as statewide, P-20 initiative to improve workforce educational capacity in STEM fields. Although headquartered at Clemson, the primary focus of CUCWD is supporting technician education in 2-year colleges through digital learning tools, providing supportive resources for P-20 STEM engagement, and conducting research on the efficacy of digital learning in these contexts. Since its founding, CUCWD has- with local and national partners- successfully obtained over \$53M of federal, foundation and private funding to support workforce development activities.



The CUCWD Advanced Technological Education Center, under construction at Clemson University, will provide collaborative, public/private space to stimulate partnership among universities, companies, K-20 educational partners and state agencies

DIGITAL LEARNING & TECHNICAL COLLEGE PARTNERSHIPS. CUCWD partners with all sixteen of SC's technical colleges to develop industry-relevant, modular e-learning tools to improve technical education in under-resourced settings. By providing digital tools and support resources to SC's two-year colleges, two-thirds of which are in rural counties, Clemson can better serve students residing in rural areas. These digital resources create opportunities to improve technician and STEM education and increase workforce preparedness for a much larger and more diverse population of SC college students. CUCWD uses open online platforms designed to disseminate digital learning tools broadly. Available at www.educateworkforce.com, the platforms include self-paced learning tools, iBooks, brief video lectures, virtual reality simulations, and instant feedback assessments.

Earlier this year, Clemson and the South Carolina Technical College System (SCTCS) signed a letter of intent to streamline the process for two-year college graduates with a specified

1. U.S. Census Bureau, 2000 Census and 2010 American Community Survey.

2. The National Bureau of Economic Research. (n.d.) ESA calculations using Current Population Survey public-use, Cambridge, MA.

cumulative grade point average (GPA) in a transfer-oriented Science, Technology, Engineering, Math (STEM) major to enroll as juniors. This will provide additional options for state students to obtain a bachelor’s degree and also has the potential to save students over \$10,000 in tuition costs. This collaboration, facilitated by CUCWD, has helped Clemson take the lead as a four-year research university supporting a statewide transfer culture that does not presently exist in SC.

CUCWD disseminates innovations in digital learning to assist ATE Centers and two -year colleges as they develop advanced manufacturing, aviation, and automotive technician education programs.

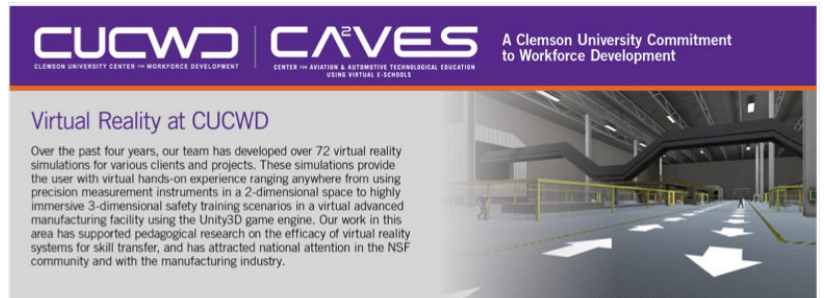
VIRTUAL REALITY AND SIMULATIONS.

Virtual Reality systems have shown the potential to provide the user with a sense of immersion that promotes learning and growth. CUCWD uses principles of gaming to create interactive virtual reality simulations for advanced manufacturing settings. CUCWD also engages in academic research contributing to the body of knowledge on how digital learning and VR impact technician education. These activities are bolstered by research expertise at Clemson, including instructional design, mechanical engineering, computer science and human factors and virtual environments.

OUTREACH. CUCWD also focuses on growing the pipeline of talent by reaching out to high schools, high school faculty and counselors, and underserved populations (specifically women, minorities, and those from rural areas) to increase interest in advanced manufacturing careers. In 2013, CUCWD implemented a \$4 million private foundation grant that impacted over 25,000 SC educators and students (P-12 schools, 2-year and 4-year institutions).³ CUCWD continues to collaborate through grant

<p>VIDEO LECTURES Lectures are presented through engaging video for visual and auditory learners, complete with illustrations, images and voiceover. Subtitles are also provided to increase accessibility.</p>	<p>VIRTUAL REALITY SIMULATIONS Virtual reality simulations on EducateWorkforce serve as online labs, where learners can go beyond the lecture to actually engage with the material.</p>	<p>OPEN TEXT Robust open textbooks are provided for all courses on EducateWorkforce. This traditional learning tool is a perfect compliment to the other forms of online content.</p>	<p>INTERACTIVE ASSESSMENTS Reinforcement of learning materials on EducateWorkforce come in the form of interactive assessments. Immediate feedback as well as an instructor-led grading system are both available.</p>

E-learning tools available at www.educateworkforce.com



Virtual Reality

3-Dimensional Virtual Environments



3D modules

3. “Clemson Program Helps Students Imagine Their Future” Greenville News, April 24, 2014. <http://www.greenvilleonline.com/story/news/education/2014/04/24/clemson-program-helps-students-imagine-future/8133357/>; “Students Learn about next-generation jobs in after school programs” Clemson Newsstand, April 21, 2014: <http://newsstand.clemson.edu/mediarelations/students-learn-about-next-generation-jobs-in-after-school-programs/>

opportunities to support women and minorities who are interested in STEM majors and careers.⁴ CUCWD focuses on increasing interest in and improving awareness of manufacturing careers and opportunities, along with changing the perception of advanced manufacturing. This approach directly responds to feedback from industry and state economic development data that indicate that there is a lack of both qualified technicians and high school students interested in entering these fields. Overcoming such barriers of perception can mean the difference between long-term low-income employment and a family-supporting salary.⁵

CLEMSON UNIVERSITY YOUTH LEARNING INSTITUTE

Serving over 30,000 individuals annually, Clemson's [Youth Learning Institute \(YLI\)](#), offers a diverse range of experiential educational programs targeting K–12 students across SC. YLI partners with CUCWD, K–12 educational partners, nonprofits, faculty who conduct human development research and social service agencies to create innovative programming for youth from all socioeconomic and intellectual backgrounds. With facilities across the state, programs for academically talented students (including [Summer Scholars](#) and [C-CATS](#)) and resources for youth facing significant social and economic obstacles, YLI builds opportunities tailored to the specific needs of young people. Filling a unique niche in SC, YLI creates opportunities for youth facing significant obstacles to success. In 2004, recognizing the high costs of youth incarceration to individuals and to SC, YLI partnered with the SC Department of Juvenile Justice (SCDJJ) to create educational program alternatives to youth incarceration for non-serious offenses. The intent of these SCDJJ programs is to keep youth out of the prison system and moving toward high school completion and workforce participation.



High school students participate in the Summer Scholars Biology boot camp at Clemson

4. CUCWD provided funding for programs including Women in Science and Engineering (WISE) “Wed Do Math!” and “Project Wise” summer camp, and the “Math Excellence Workshop” for PEER. Working together, CUCWD, PEER, and WISE support programs to strengthen math and science skills for high school students who are interested in entering engineering programs at Clemson.

5. Manufacturing provides an average entry level manufacturing salary of \$40,000 with benefits, compared to \$16,000 for SC wages in tourism and hospitality. Cluster Mapping Project: Institute for Strategy and Competitiveness, Harvard Business School.



C-CATS - <u>C</u>lemson's <u>C</u>hallenge for <u>A</u>cademically-<u>T</u>alented <u>S</u>tudents	C-CATS is an early recruitment program for top 9th and 10th grade students from SC, NC and GA, designed to introduce Clemson University and help students prepare for application to selective universities.
Youth Leadership Academy Charter School	Youth Leadership Academy is Pickens County's first charter school. YLA serves 144 middle school students and presently ranks 6 th among all middle schools in South Carolina.
YLI Field Study Programs	YLI operates academic field study programs at sites across the state, including: <ul style="list-style-type: none"> • Teaching KATE (Environmental Education) • E-Tech (Environmental Technology) • Expedition Sewee (Marine Biology) • CSI: Clemson Student Investigators (Forensic Science) • Exploration Hannon (Mountain Ecology)
Summer Scholars Faculty-Led Summer Academic Programs for 7th-12th graders	On-campus residential, summer enrichment programs for gifted middle and high school students for the past 5 years.
<h2 style="margin: 0;">Empowering Vulnerable Youth</h2>	
New Horizons	A partnership with the S.C. Department of Social Services, New Horizons is a residential group home program for teen mothers in foster care and their children. The program allows young women to remain united and bond with their babies as they learn life skills for successful transition to independent living after foster care.
OYDP (Outdoor Youth Development Program)	OYDP serves students from grades 7-12 who are not making satisfactory progress in a traditional education setting, including students who have been retained more than once, those who have been expelled or recommended for expulsion and students transferring between schools who are in danger of not earning credit.
W.W. Long Youth Development Center	A partnership with the S.C. Department of Juvenile Justice, the YDC houses nonviolent, determinate sentenced female juveniles in a residential, camp-like setting. Students continue their education with hands-on curriculum modules that align with S.C. educational standards while learning new ways to behave and think about their futures. Academic themes include aerospace, zoology, electricity, marine science, horticulture, food and nutrition, & mechanical science with an emphasis on vocational education.
Camp Ghigau	A second partnership with the S.C. Department of Juvenile Justice, this 28-bed facility offers alternative placement for intermediate-level, male juvenile offenders in a mountain wilderness setting. Like the YDC, the program places heavy emphasis on behavior modification and preparing young men for successful transitions back to their homes, communities and schools.